CHBE 343 – Chemical Engineering Laboratory I

Spring 2022

Overview

This course reinforces fundamental principles taught in prerequisite courses through hands-on experience in the design and execution of experiments with emphasis on process scaling, instrumentation, experimental design, and technical writing.

Lab Section T 1:00-4:00 pm, Keck 108

Lecture Section Th 2:45-4:05 pm, Online except for Feb 10 and 17 these will be lab sections

Instructors

Dr. Marya Cokar, Room AEL-B226, marya.cokar@rice.edu

Mr. Jacob Arredondo, jha1@rice.edu

Teaching Assistants

Yousef Al-Shamlan, yalshamlan@rice.edu

Yuhang Ma, ym21@rice.edu

Program Objectives and Student Outcomes

This course will cover the following student outcomes

SO 5 An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive work environment, establish goals, plan tasks, and meet objectives.

SO 6 An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

Course Learning Objectives

Modified from Proceedings of the 2003 American Society for Engineering Education Annual Conference &
Exposition Copyright © 2003, American Society for Engineering Education

Experiments: Devise an experimental approach, specify appropriate equipment and procedures, implement these procedures, and interpret the resulting data to characterize engineering material, component, or system.

Data Analysis: Demonstrate the ability to collect, analyze, and interpret data, and to form and support conclusions. Make order of magnitude judgments, and know measurement unit systems and conversions.

Learn from Failure: Recognize unsuccessful outcomes due to faulty equipment, parts, code, construction, process, or design, and then re-engineer effective solutions.

Creativity: Demonstrate appropriate levels of independent thought, creativity, and capability in real-world problem solving.

Safety: Recognize health, safety, and environmental issues related to technological processes and activities, and deal with them responsibly.

Communication: Communicate effectively about laboratory work with a specific audience, both orally and in writing, at levels ranging from executive summaries to comprehensive technical reports and oral presentations.

Teamwork: Work effectively in teams, including structure individual and joint accountability; assign roles, responsibilities, and tasks; monitor progress; meet deadlines; and integrate individual contributions into a final deliverable.

Laboratory Ethics: Behave with highest ethical standards, including reporting information objectively and interacting with integrity.

Academic Integrity

Students are required to review and abide by the *Rice Honor Code*, which can be found at honor.rice.edu. It is the instructor's understanding and expectation that the student's signature on any test or assignment means that the student contributed to the assignment individually or as a team member and that he or she neither gave nor received unauthorized aid. All laboratory reports are treated the same as pledged exams. You may not consult with members of other teams in any way about your reports. You may not receive help from anyone outside of your team with the exception of the instructor and the TA's. You may not consult lab reports from previous CHBE lab courses. Failure to comply with this policy will be immediately reported to the Honor Council for further actions. This policy will be strictly enforced.

Safety Regulations
You must wear the following Personal Protective Equipment (PPE) at <u>all times</u> while in the lab (no exceptions)

- Safety glasses/goggles
- Long sleeve laboratory coat
- Clothing that fully covers yourself to the ankle (pants are best)
- Closed-toe shoes with backs (full coverage shoes are best, high heels are prohibited)

Based on the experiment or procedure, additional PPE such as gloves may be required. Laboratory gloves should only be worn inside the laboratory.

Students will not be allowed to work the lab if they fail to meet these safety regulations

Furthermore, the instructor or lab assistant must always be physically present for you to work in the lab. Students will not be allowed to work in the lab if they fail to meet these safety regulations.

Attendance

Attendance to class and experimental sessions is mandatory and lateness is not acceptable. In the case of the experimental sessions, there is a tolerance window of 5 minutes. Students are not allowed to leave the class/experimental session once it has started.

Missing a class/experimental session will be counted as an absence, the only exception is a previous commitment with a Rice sports team. If this is the case, the student should bring a note signed by the coach, specifying the date and time of the game. If any extenuating circumstances prevent your attendance, you are expected to notify the instructor by email in advance. If you do not receive a return email confirming the agreement, you must contact the instructor by other means. If medical or other circumstance makes advance notification impossible, you are expected to submit justification for your absence in writing. Those excused from class are still responsible for all lecture materials and lab reports.

Students are required to sign an attendance sheet prior to the end of each class session. This attendance sheet is governed by the Rice honor code policy.

Each unexcused absence will result in a loss of five (5) percent of the total course grade. Three or more unexcused absences will lead to a failing grade in the course.

Reports

Reports will be due one week after the experiment was completed at 11:59pm on Canvas. **Reports will not be accepted if they are turned in at a different day/time or by email**. Any regrading request must be done within one week after the report was returned. In this case, no specific sections but the full report will be regraded. All regrade requests must be made in writing.

Textbook

No textbook is required, but all texts from prior chemical engineering coursework will be useful for reference of technical materials.

Recommended Reading:

- Michael Alley, *The Craft of Scientific Writing, Springer* (1996) 3rd Edition ISBN- 0-387-94766-3
- Michael Alley, *The Craft of Scientific Presentations* (2013) 2nd Edition ISBN- 978-1-4419-8278-0
- Gregory S. Patience, *Experimental Methods & Instrumentation for Chemical Engineers*, 1st Edition, El Sevier (2013), ISBN-13: 978- 0444538048
- Lucile Vaughan Payne, *The Lively Art of Writing*, Signet (1969), ISBN-13: 978-0451627124
- Jack P. Holman, *Experimental Methods for Engineers*, Seventh Edition, McGraw-Hill (2000)
- Howard M. Kanare, *Writing the Laboratory Notebook*, American Chemical Society (1985)

Coursework and Grading

Canvas Quizzes 10%

Active Participation in Lectures 10%

Lab Notebooks and Lab Participation 20%

Lab Reports 55%

Anything handed in late will be deducted 20 points each day. Extension to deadlines for extenuating circumstances must be received in writing via email within 24 hours of a missed deadline.

Placing your name on an assignment or project on which you didn't participate is a violation of the Honor Code.

Each team member must submit a participation grade for themselves and each group member for each project. This means that you can obtain a score lower than your team members.

Canvas

You will be required to watch a video on Canvas for each laboratory experiment. After the video you must complete a short quiz prior to starting your laboratory experiment. You will not be allowed in the lab if you do not pass the quiz with a grade of at least 80%. You will have two attempts to pass this quiz.

Information Contained in this Syllabus

The information contained in this course syllabus, other than the absence policies, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.

Any student with a documented disability seeking academic adjustments or accommodations is requested to speak with Dr. Cokar during the first two weeks of class. All discussions will remain as confidential as possible. Students with disabilities will need to also contact Disability Support Services (x5841) in the Allen Center